

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1.(Currently Amended)      A method for encoding a plurality of bits, comprising:  
    based on a plurality of bits, selecting one of at least two mutually exclusive subsets  
of a signal constellation and a point within said selected subset; ~~and~~  
    modulating the selected point using a carrier waveform; and  
    transmitting the modulated point,  
wherein the selected subset includes at least two constellation points that are separated  
from one another by a distance based on a conditional distribution.

2.(Previously Presented)      A method for encoding a plurality of bits, comprising:  
    based on a plurality of bits, selecting one of at least two mutually exclusive subsets  
of a signal constellation and a point within said selected subset; and  
    modulating the selected point using a carrier waveform,  
wherein the selected subset includes at least two constellation points that are separated  
from one another by one of a Kullback-Leibler distance and an expected Kullback-Leibler  
distance.

3.(Original)      The method of claim 1, wherein selecting a subset of a signal constellation  
and a point within said selected subset comprises, based on a plurality  $m=k_1+k_2$  of bits,  
using  $k_1$  of the bits to select said subset and  $k_2$  of the bits to select the point within said  
subset, wherein  $m$ ,  $k_1$  and  $k_2$  are non-zero integers.

4.(Previously Presented)      A method for encoding a plurality of bits, comprising:  
    based on a plurality of bits, selecting, based on a plurality  $m=k_1+k_2$  of bits, using  $k_1$   
of the bits to select one of at least two mutually exclusive subsets of a signal constellation  
and using  $k_2$  of the bits to select a point within said selected subset, wherein  $m$ ,  $k_1$  and  $k_2$   
are non-zero integers; and  
    modulating the selected point using a carrier waveform,  
wherein the selected subset includes at least two constellation points that are separated  
from one another by a distance based on a conditional distribution, and

wherein using  $k_1$  of the bits to select said subset comprises encoding the  $k_1$  bits into  $n$  encoded bits, and selecting one of  $2^n$  mutually exclusive subsets with the  $n$  encoded bits, wherein  $n$  is greater than  $k_1$ .

5.(Original) The method of claim 4 wherein  $k_2=1$  and  $n=k_1+1$ .

6.(Original) The method of claim 5 wherein  $n$  is selected from the set consisting of three, four and five, wherein the  $k_1$  bits are encoded using a 2/3 convolutional code when  $n=3$ , the  $k_1$  bits are encoded using a 3/4 convolutional code when  $n=4$ , and the  $k_1$  bits are encoded using a 4/5 convolutional code when  $n=5$ .

7.(Currently Amended) A method for encoding a plurality of bits, comprising:  
based on a plurality of bits, selecting one of at least two mutually exclusive subsets of a signal constellation and a point within said selected subset; ~~and~~  
modulating the selected point using a carrier waveform; and  
transmitting the modulated point,

wherein the selected subset includes at least two constellation points that are separated from one another by a distance based on a conditional distribution, and  
wherein the constellation points define concentric circles, and every point lying within a circle is from a different subset from every other point lying on that circle.

8.(Original) The method of claim 7 wherein every point on a circle is from a different subset from every other point lying on that circle and from every other point lying on an adjacent circle.

9.(Original) The method of claim 8 wherein  $n=3$  and each subset defines two points.

10.(Original) The method of claim 1 further comprising transmitting the carrier, receiving the carrier over a fading channel, and decoding the symbol using a Viterbi algorithm.

11.(Currently Amended) A transmitter for transmitting a series of input bits comprising:

an encoder having an input for receiving a plurality of input bits;  
a mapper having an input coupled to an output of the encoder; ~~and~~  
a computer-readable storage medium coupled to the mapper for storing at least one signal constellation;

a modulator having an input coupled to an output of the mapper; and  
a transmit antenna having an input coupled to an output of the modulator,

wherein the mapper selects a subset of said signal constellation and a point within the selected subset based on the plurality of input bits, said selected subset including at least two constellation points that are separated from one another by a distance based on a conditional distribution.

12.(Previously Presented) A transmitter for transmitting a series of input bits comprising:

an encoder having an input for receiving a plurality of input bits;  
a mapper having an input coupled to an output of the encoder; and  
a computer-readable storage medium coupled to the mapper for storing at least one signal constellation,

wherein the mapper selects a subset of said signal constellation and a point within the selected subset based on the plurality of input bits, said selected subset including at least two constellation points that are separated from one another by one of a Kullback-Leibler distance and an expected Kullback-Leibler distance.

13.(Original) The transmitter of claim 11, wherein the plurality of input bits comprises  $m=k_1+k_2$  of bits, of which  $k_1$  of the bits are used to select said subset and  $k_2$  of the bits are used to select the point within said subset, wherein  $m$ ,  $k_1$  and  $k_2$  are non-zero integers.

14.(Currently Amended) A transmitter for transmitting a series of input bits comprising:

an encoder having an input for receiving a plurality of input bits;  
a mapper having an input coupled to an output of the encoder; ~~for; and~~  
a computer-readable storage medium coupled to the mapper for storing at least one signal constellation;

a modulator having an input coupled to an output of the mapper; and  
a transmit antenna having an input coupled to an output of the modulator,

wherein the mapper selects a subset of said signal constellation and a point within the selected subset based on the plurality of input bits, said selected subset including at least two constellation points that are separated from one another by a distance based on a conditional distribution, and

wherein the encoder encodes  $k_1$  of the bits into  $n$  encoded bits, and the mapper selects one of  $2^n$  mutually exclusive subsets using the  $n$  encoded bits, wherein  $n$  is greater than  $k_1$

15.(Original) The transmitter of claim 14 wherein  $k_2=1$  and  $n=k_1+1$ .

16.(Original) The transmitter of claim 15 wherein  $n$  is selected from the set consisting of three, four and five, wherein the  $k_1$  bits are encoded using a  $2/3$  convolutional code when  $n=3$ , the  $k_1$  bits are encoded using a  $3/4$  convolutional code when  $n=4$ , and the  $k_1$  bits are encoded using a  $4/5$  convolutional code when  $n=5$ .

17.(Currently Amended) A transmitter for transmitting a series of input bits comprising:

an encoder having an input for receiving a plurality of input bits;

a mapper having an input coupled to an output of the encoder; and

a computer-readable storage medium coupled to the mapper for storing at least one signal constellation;

a modulator having an input coupled to an output of the mapper; and

a transmit antenna having an input coupled to an output of the modulator,

wherein the mapper selects a subset of said signal constellation and a point within the selected subset based on the plurality of input bits, said selected subset including at least two constellation points that are separated from one another by a distance based on a conditional distribution, and

wherein the constellation points define concentric circles, and every point lying within a circle is from a different subset from every other point lying on that circle.

18.(Original) The transmitter of claim 17 wherein every point on a circle is from a different subset from every other point lying on that circle and from every other point lying on an adjacent circle.

19.(Original) The transmitter of claim 18 wherein  $n=3$  and each subset defines two points.

20.(Original) The transmitter of claim 12 further comprising a receiver, said receiver said receiver using a Viterbi algorithm to decode a received symbol into a subset and a point within the subset according to the constellation.

21.(Original) A method for encoding a plurality of  $m=k_1+k_2$  input bits comprising:

selecting a subset of a signal constellation based on the  $k_1$  input bits;

selecting a point within the selected subset based on the  $k_2$  input bits, wherein at least two points within the selected subset are spaced from one another by a distance based on a conditional distribution of at least one of said at least two points;

and

modulating the selected point using a carrier waveform,

wherein  $m$ ,  $k_1$  and  $k_2$  are non-zero integers, and at least one of  $k_1$  and  $k_2$  are greater than one.

22.(Previously Presented) A method for encoding a plurality of  $m=k_1+k_2$  input bits comprising:

selecting a subset of a signal constellation based on the  $k_1$  input bits;

selecting a point within the selected subset based on the  $k_2$  input bits, wherein at least two points within the selected subset are spaced from one another by a distance based on a conditional distribution of at least one of said at least two points; and

modulating the selected point using a carrier waveform,

wherein  $m$ ,  $k_1$  and  $k_2$  are non-zero integers, and at least one of  $k_1$  and  $k_2$  are greater than one, and

wherein selecting a subset of a signal constellation based on the  $k_1$  input bits comprises encoding the  $k_1$  input bits into  $n$  encoded bits, and selecting one of  $2^n$  subsets using the  $n$  encoded bits,

wherein  $n$  is an integer greater than  $k_1$  that is derived from the  $k_1$  bits and a previously input plurality of bits.

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23.(Original) The method of claim 22, wherein each subset consists of two points and the signal constellation consists of  $2^{m+1}$  points.